

## Remarks

The prior claims had been rejected over Häyhä U.S. 4,756,896 ("*Häyhä*"). *Häyhä* discloses a method for producing brown amorphous silicon metal by high temperature reduction of  $\text{SiF}_4$  gas with a group I or II metal in paraffin oil as a reaction medium. The reaction takes place at 300 - 350°C. Because of this high reaction temperature, reaction of the silicon metal surface with impurities and byproducts in the reaction is facilitated, as a result of which the silicon particles do not have a silicon surface, but rather a reacted, or "coated" silicon surface. The particles are brown. See, *e.g.* column 3, lines 61 - 64. The reaction must take place within the narrow temperature range of 300 - 350°C. See column 2, line 53 to column 3, line 3.

*Häyhä* discusses the prejudice for use of "low" temperatures in the prior art, and employed a temperature range of 300 - 350°C, much lower than the prior art. Applicant has found, however, that if conventional aprotic solvents such as benzene, hexane, toluene, xylene, and the like are used, the reduction may take place at far lower temperatures. In one preferable embodiment, the reaction takes place just above the melting point of sodium, 96°C, and preferably below the boiling point of the solvent. In example 2, for instance, the reaction is conducted in m-xylene (b.p. 138.8) at a temperature in the range of 110 - 120°C. By avoiding high temperatures, the reaction is much more economical than that of *Häyhä*.

Surprisingly, however, Applicant's reaction produces black amorphous silicon rather than brown amorphous silicon. This difference is highly significant, because the brown color of brown amorphous silicon is indicative of a coating on the silicon surface. See, *e.g.* the specification at page 2, fourth full ¶, continuing to the top of page 3. The formation of black amorphous silicon is also important because this form is much more reactive than the brown form in the direct synthesis of organochlorosilanes. See page 6 of the specification. *Häyhä* does not disclose any process for the manufacture of black amorphous silicon.

Claims 54, 57, and 60 require the use of an apolar solvent containing toluene or xylene, both relatively low boiling solvents. Claim 56 recites that a hexafluorosilicate salt is

reduced. *Häyhä* indicates that "sodium silicon tetrafluoride" (sodium hexafluorosilicate) is undesirable. Column 3, lines 48 - 60. *Häyhä* states that this compound does not even react with sodium. Column 3, lines 56 - 57. Rather, *Häyhä* uses sodium hexafluorosilicate to disproportionate into sodium fluoride and tetrafluorosilane at 700°C (column 3, lines 23 - 32).

Applicants submit that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, the Examiner is highly encouraged to telephone Applicants' attorney at the number given below.

The 3 month Petition fee of \$1,110.00 is being charged to Deposit Account No. 02-3978 via electronic authorization submitted concurrently herewith. The Commissioner is hereby authorized to charge any additional fees or credit any overpayments as a result of the filing of this paper to Deposit Account No. 02-3978.

Respectfully submitted,  
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